

Final (October 28, 2005)
List of Instream Public Uses, Outstanding Characteristics, and Resources
(IPUOCR)
Lamprey River
For the
Protected Instream Flow (PISF) Study

The New Hampshire Department of Environmental Services (DES) has defined the Instream Public Uses, Outstanding Characteristics, and Resources (IPUOCR) that must be evaluated and included in the development of a PISF Study and eventual Water Management Plan (WMP). Categories of potential IPUOCR include the following:

- Navigation: The use of the river for non-recreational, transportation purposes.
- Recreation: Use of the river for swimming, boating or significant shoreland recreation such as hiking, camping, picnicking and bird watching.
- Fishing: both Recreational Use and Commercial Use
- Storage: Natural or man-made attributes of a river for water storage.
- Conservation/Open Space: Issues concerning management of open space, conservation easements or municipal, state or federal parks.
- Maintenance and Enhancement of Aquatic and Fish Life: Those aquatic-dependent species that make up a balanced, integrated and adaptive community of organisms having a species composition, diversity and functional organization comparable to that of similar natural habitats of a region.
- Fish and Wildlife Habitat: Species that rely on flow and flow to regions which are important to the survival of fish and wildlife populations, including but not limited to: spawning and feeding beds, waterfowl breeding or wintering areas, freshwater wetlands or riparian habitat.
- Rare, Threatened or Endangered (RTE): fish, wildlife, vegetation or natural/ecological communities: As listed by New Hampshire Natural Heritage Inventory (NHI) and nomination papers.
- Water Quality Protection/Public Health: Characteristics that maintain water quality of the river including, but not limited to, chemical and physical parameters that support designated and existing uses.
- Public Water Supply: An existing source of public drinking water as defined in Env-Ws 302.02.
- Pollution Abatement: Wastewater treatment facilities or industrial treatment facilities and aspects of flow affecting assumptions of flow for dilution and dispersal of waste in mixing zones and the river's overall capacity to mitigate natural and non-point source contamination.
- Aesthetic Beauty/Scenic: Including but not limited to designated viewing areas, scenic vistas and overlooks.
- Cultural: On-going river corridor management planning effort or other local efforts to protect or manage the river, riverside parks or other public areas, or community support for riverfront revitalization.

- Historical or Archaeological: Based on the presence or absence of known historical or archaeological resources.
- Community Significance: A natural, managed, cultural or recreational resource or use thereof associated with the river that is recognized by local residents or a municipal document as being important to the community adjacent to the river.
- Hydrological/Geological: A national, regional, state or local resource as determined by the state geologist or as listed in a national or state resource assessment.
- Agricultural: As defined by RSA 21:34a.

The IPUOCR entities for the Lamprey River are extensive; a final list has been created for the purposes of dividing those entities into two categories (Flow dependent and non-flow dependent) based on a refinement of the preliminary list. This final list was prepared based on initial guidance from NHDES, the Lamprey River WMPCC and a field reconnaissance survey conducted by Normandeau and UNH in late August 2005. Future work to be completed as a part of this study may result in minor changes to this list.

Final List of Flow Dependent Entities:

RECREATION

Boating:

The designated reach is popular for canoeing and kayaking during the spring and periods of high water, particularly the Wadleigh Falls to Wiswall Dam stretch. Class II and III white water can be available in the vicinity of the Packers Falls recreational area. While the impounded sections of the river are used for boating during the low water periods, boating is very difficult in the free-flowing sections below Wadleigh Falls and Wiswall Dam to Packer's Falls during low water.

There are launching facilities both above and below Moat Island, in Durham, for sculling shells, which are used throughout the reach from the Macallen Dam in Newmarket, through the Moat Island area and up to Packers Falls. Sculling shells are used on this stretch throughout the year with the exception of periods of ice in the winter.

Public Launch sites for boating include

Doe Farm Forest, Durham
 Wiswall Dam, Durham
 Packers Falls, Durham

Swimming: There are four official beaches within the designated river segment

Wellington Campground – Lee Hook Road, Lee
 Ferndale Acres Campground – Wednesday Hill Road, Lee
 Wadleigh Falls Campground – Campground Road, Lee
 Glenmere Village Association – Tuttle Road, Lee

In addition to designated beaches, there are non-designated areas frequented by swimmers

Wadleigh Falls, Lee
Wiswall Dam, Durham
Packers Falls, Durham
Private Residences throughout reach

FISHING

Lower sections of the designated reach and further downstream are fished primarily for warmwater species such as smallmouth bass, largemouth bass, pickerel, catfish, sunfish, white perch and yellow perch

The upper sections of the designated reach along with the tributaries to the Lamprey, such as the Little River and North River are fished for trout species. The state stocks Eastern Brook Trout, Brown Trout, Rainbow Trout and Atlantic salmon into these areas. Trout Unlimited has been independently stocking trout during the fall season below Wiswall Dam and at Packers Falls

Popular Areas for recreational fishing include

The $\frac{3}{4}$ mile stretch between Wiswall Dam and Packers Falls (Durham)
The stretch between the North and Little Rivers (Lee)
Cartland Road / Little River Bridge (Lee)
Lee Hook Road / Lamprey River Bridge (Lee)

STORAGE

There is one active dam within the Designated Reach: Wiswall Dam in Durham

MAINTENANCE AND ENHANCEMENT OF AQUATIC AND FISH LIFE

Native Fish Species

Species present in the designated reach of the Lamprey River include American Eel, Atlantic Salmon, Brook Trout, American Shad, Alewife, Blueback Herring, Sea Lamprey, Pumpkinseed, Redbreast Sunfish, Banded Sunfish, Chain Pickerel, Redfin Pickerel, Brown Bullhead, Yellow Bullhead, Yellow Perch, Golden Shiner, Bridled Shiner, Common Shiner, Blacknose Dace, Longnose Dace, Creek Chubsucker, Fallfish, Swamp Darter, White Perch, Common White Sucker.

Introduced Fish Species

Species present in the designated reach of the Lamprey River include Brown Trout, Rainbow Trout, Largemouth Bass, Smallmouth Bass, Bluegill, Rock Bass and Black Crappie. Although these species are not native, they have been introduced and are part of the aquatic community

Anadromous Fisheries

The fish ladder on the Macallen Dam in Newmarket passes alewife, blueback herring, American shad, sea lamprey, Atlantic salmon and American eels (a catadromous species). Existing anadromous fish habitat exists from Great Bay up to Wiswall Dam. Potential anadromous habitat exists above Wiswall Dam pending the construction of a fish passage facility. Based on bathymetry which indicates that the geology of the Wiswall Dam area was historically a low incline of ledge and rock, it is probable that any of the above anadromous species that were capable of passing Packers Falls (alewife, blueback herring, American shad, sea lamprey, Atlantic salmon and American eel) could successfully head upriver to spawn at least as far as Wadleigh Falls (Patterson 2005).

Mussels

The Lamprey is host to six species of freshwater mussel (Wicklow 2005). A 1993-1994 survey on portions of the Lamprey found healthy populations of six freshwater mussel species including the Brook Floater, a state-listed endangered species which was documented in Lee, below Wadleigh Falls, and in West Epping (LWSRS 1995).

The North Branch has been suggested as a possible site for the Triangle Floater (*Alasmodonta undulata*), a species which appears to be on the decline in southeastern NH

Insects

There are a variety of insects which are dependant upon a river system for habitat and breeding grounds. In this study, dragonflies and damselflies are of most concern for the following reasons; they are good indicators of water quality and are easily identifiable. If water is impacted through sedimentation, an increase or decrease in stream flow or other drastic event, these insects are affected, as their presence indicates high quality water. The only species of dragonfly which is listed as endangered in New Hampshire is the Ringed bog hunter (*Williamsonia lintneri*).

MAINTENANCE AND ENHANCEMENT OF AQUATIC AND FISH LIFE

Reptiles and Amphibians:

- Informal observations include two species of snake (Northern Water Snake and Ribbon Snake) eight species of frogs and toads (Spring Peeper, Gray Treefrog, Bullfrog, Green Frog, Wood Frog, Northern Leopard Frog, Pickerel Frog, Common American Toad) five species of salamander (Jefferson Salamander, Spotted Salamander, Eastern Newt, Northern Two-lined Salamander) and six species of turtle (Spotted Turtle, Blanding's Turtle, Snapping Turtle, Wood Turtle, Painted Turtle, Musk Turtle) which are flow dependent.

RTE: FISH, WILDLIFE, VEGETATION OR NATURAL/ECOLOGICAL COMMUNITIES

Fish:

The designated reach provides habitat for the Bridled Shiner (*Notropis bifrenatus*) (Cairns 2005). This fish prefers sluggish mud bottomed pools of creeks and small to medium rivers, often in vegetation. David Carroll reported catching Banded Sunfish in turtle traps (Carroll 1996). This species prefers slow water areas and impoundments with heavily vegetated areas.

Macroinvertebrates:

The designated reach provides habitat for the Brook Floater (*Alasmodonta varicose*), a state-listed endangered mussel species. These mussels prefer areas of cobble/sand substrate with moderate current (Cairns 2005).

Reptiles and Amphibians:

The designated reach provides habitat for the spotted turtle (*Clemmys guttata*), wood turtle (*Glyptemys insculpta*) and Blanding's turtle (*Emydoidea blandingii*) (Cairns 2005).

Birds:

- Bald eagles (state and federally endangered) and osprey (state threatened) believed to be nesting near the river – potential to be using river as a feeding area.
- Two other state endangered species, the pied-billed grebe and the sedge wren, have occurred in the four lower Lamprey towns
- Of the 159 species of birds have been sited in the four lower Lamprey towns, waterfowl and wading species such as the American black duck and the black-crowned night heron are considered flow dependent

Vegetation:

The designated reach potentially contains the following species of endangered or threatened flora that are likely flow dependent: water marigold (*Megalodonta beckii*), sharp-flowered mannagrass (*Glyceria acutiflora*), knotty pondweed (*Potamogeton nodosus*), blunt spenopholis (*Sphenopholis obtusata*), small-crested sedge (*Carex cristatella*), slender blue flag (*Iris prismatica*) (Cairns 2005), and climbing hempweed (*Mikania scandens*) (Sperduto and Crow 1994).

Ecological Communities:

The designated reach contains areas classified as swamp white oak floodplain forest (Cairns 2005). Oxbow marsh, floodplain vernal pool, floodplain forest, oxbow shrub-swamp, high energy riverbank and river rapids are all flow dependent communities found within the designated reach of the Lamprey River (Sperduto and Crow 1994).

FISH AND WILDLIFE HABITAT

Fish:

- Freshwater portions of the Lamprey River, including the designated reach, provide spawning and rearing habitat for resident and anadromous fish

Habitat

- Significant community types include river rapids, floodplain ecosystems, white oak swamp, and the Moat Island area (Durham). Includes 252 species of vascular plants that are restricted to wetlands and floodplain communities.

PUBLIC WATER SUPPLY

The UNH-Durham water system has a withdrawal from the impounded area above Wiswall Dam that is subject to the Clean Water Act Section 401 water quality certification. This taps directly into the Designated River portion of the Lamprey

The Towns of Lee and Newmarket view the Lamprey as a potential water supply. Newmarket has a treatment plant that can treat water from Follett's Brook, the Piscassic River and the Lamprey (below Wiswall Dam). The Town of Lee is currently assessing water resources on town owned land but the Lamprey River, above Wadleigh Falls, may be an alternative.

Final List of Non-Flow Dependent Entities:

RECREATION

Shoreland Recreation:

Hiking – designated public trails along the river at the Doe Farm, Durham

Horseback Riding – trails along the river at the Benevento Sand & Gravel and Spang properties are used by horses

Bird watching -

Winter sports – Cross country skiers and snowmobilers make use of trails on private land that cross back and forth over the river during the winter months. Skaters use the lower portions of the designated reach.

Recreational Sites within 0.25 miles of the Designated Reach

Doe Farm, Durham
Thompson Farm, Durham
Packers Falls Recreational Area, Durham
Wiswall Road Area, Durham
Ferndale Acres, Lee
Lamprey River Campground, Lee
Wellington Campground, Lee

Piscassic Street Park, Newmarket

CONSERVATION/OPEN SPACE

Open Space parcels include the following:

- Durham: The eight-hundred acre Doe Farm contains 750' of river frontage along with extensive trails. Within the Town of Durham, there is an additional 7 miles of undeveloped river frontage that is largely wooded
- Lee: Within the Town of Lee, eight properties account for 7.8 miles of wooded habitat and fields with river frontage bordered with trees

MAINTENANCE AND ENHANCEMENT OF AQUATIC AND FISH LIFE

Reptiles and Amphibians:

- Informal observations include seven species of snake (Smooth Green Snake, Common Garter Snake, Eastern Hog-nosed Snake, Eastern Ringneck, Racer, Milk Snake, Redbelly Snake) and one species of salamander (Redback Salamander) which are not flow dependent.

FISH AND WILDLIFE HABITAT

Birds

- Heron rookery located in a large beaver marsh that adjoins the river in Lee

RTE: FISH, WILDLIFE, VEGETATION OR NATURAL/ECOLOGICAL COMMUNITIES

Birds:

- One state endangered species, the peregrine falcon has occurred in the four lower Lamprey towns
- Of the 159 species of birds have been sited in the four lower Lamprey towns, the red-shouldered hawk, whip-poor-will, bobolink, eastern meadowlark, least flycatcher, wood thrush and American redstart, are all species considered uncommon elsewhere in the state. These species are not flow dependent.

Vegetation:

The designated reach contains the following species that are designated endangered or threatened: Philadelphia panic grass (*Panicum philadelphicum*), northern blazing star (*Liatris scariosa*), blunt-lobed woodsia (*Woodsia obtusata*), Missouri rock cress (*Arabis missouriensis*), and downy false foxglove (*Aureolaria virginica*) (Cairns 2005).

WATER QUALITY PROTECTION/PUBLIC HEALTH

Designated Lamprey section supports Class B water quality which is suitable for swimming, fishing and other recreational uses. Water Quality stations used by NHDES Volunteer River Assessment Program and NHDES Ambient Rivers Monitoring Program are located within the designated reach.

AESTHETIC BEAUTY/SCENIC

Large proportion of undeveloped land makes the Lamprey a valuable resource in terms of scenic beauty

Three scenic waterfalls: Wadleigh Falls, Wiswall Falls, Packers Falls

Best river views are from the bridges: Wadleigh Falls Road, Lee Hook Road, Wiswall Road, Packer's Falls Road

CULTURAL/COMMUNITY SIGNIFICANCE

Lamprey River Advisory Committee: representatives from Durham, Epping, Lee and Newmarket charge with developing and implementing a river management plan under the NH State River Management and Protection Program

Lamprey River Watershed Association: involved in land protection, water quality monitoring and publication of a layman's water quality monitoring guide, public education, recreational activities, assistance with waterfront development proposals, and the Lampreys designation as a Wild and Scenic River

HISTORICAL OR ARCHAEOLOGICAL

According to the New Hampshire Division of Historical Resources, New Hampshire Archaeological Inventory, there is one site of historical significance within 100 meters of the Lamprey River along the designated reach. This site is located in Durham.

Historical Resources located in the towns along the designated reach include the following:

- Durham: Wiswall Falls Mill Site, address restricted. Listed; 03-18-1988.

Wadleigh Falls is recognized as one of the earliest and the states most important archaeological sites. It is "rich in prehistoric cultural remains found in an undisturbed context".

Wiswall Falls has had some archaeological exploration – 19th century artifacts, colonial material and evidence of ancient Indian residence

HYDROLOGICAL/GEOLOGICAL

Bedrock Geology:

Earliest rocks are 410 to 650 million years old Avalonian Composite Terrane consisting of the metamorphic rocks of the Massabesic migmatite and the Merrimack Group intruded locally by the Exeter diorite and a two-mica granite. Key rock formations of the Merrimack Group are the Kittery, Elliot and Berwick formations. The Kittery outcrops only rarely as at Wadleigh Falls.

Surficial Deposits:

During the latest glaciation, ice came into contact with the ocean near West Epping. West of this line are glacial contact deposits of till and a thin ground moraine, and eskers, as well as outwash. East of this line are delta sands and gravels and marine clay and silt deposits. This region's sand and gravel pits are also Ice Age remnants, as are Spruce Hole Bog in Durham (National Natural Landmark) and the kettle hole on the Benevento property.

Groundwater:

Within the designated reach there are several relatively small and isolated stratified drift aquifers that may be flow dependent.

In addition the town wells of Durham (gravel packed well), Epping (bedrock well with a back-up gravel packed well) and Newmarket (2 gravel packed wells) may be flow dependent.

AGRICULTURAL

There are 12 active or inactive (reforested) farms and tree farms within 0.5 and 1.0 miles of the river. In the river corridor there are 16,500 feet of prime farmland (identified by USDA Soil Conservation Service).

Agricultural properties along the river include

Brady on Route 152 below Wadleigh Falls, Lee
Athemore Dairy Farm, Lee Hook Road, Lee
University of New Hampshire, Lee Hook Road, Lee
Unnamed, Lee Hook Road, Lee

POLLUTION ABATEMENT

Point source discharges include: Epping Wastewater Treatment Plant, Newmarket Water Treatment Plant. The Epping plant is upstream of the designated reach. The Newmarket Plant is on the Piscasset river, a tributary to the designated reach. The contribution of these facilities to the water budget of the designated reach will be evaluated as a part of the water management plan for the designated reach of the Lamprey but they are not considered flow dependent for the purpose of this study due to their geographic locations.

REFERENCES

Cairns, S. 2005. Personal Communication. New Hampshire Natural Heritage Inventory (NHI). Concord, NH.

Carroll, D. 1996. Lamprey River Turtle and Ecology Investigations: Principal Findings

Lamprey Baseline Fish Community Report (LBFC). 2003. New Hampshire Department of Environmental Services.

Lamprey IPUOCR entities – Preliminary List. 2004. New Hampshire Department of Environmental Services.

Lamprey Wild and Scenic River Study (LWSRS). 1995. Division of Rivers and Special Studies, National Park Service, Department of the Interior.

Normandeau Associates Inc. (NAI). 2005. Bedford NH.

Patterson, C. 2005. Personal Communication. New Hampshire Fish and Game Department (NHFG). Durham, NH.

Sperduto, D.D. and G.E. Crow. 1994. A vegetation Assessment of the Lamprey River Corridor in Epping, Lee, Durham and Newmarket. Prepared for the NPS.

Wicklow, B. 2005. Personal Communication. St. Anselm College. Manchester, NH.